

Finding the Math in Books: Ideas for Teaching Staff

Highlighting Number and Operations

Many children's books help young children learn about number and operations. They provide opportunities for teachers to help children explore number (counting, quantity, comparing quantity, ordering numbers, and numeral recognition) as well as operations (adding—joining to, taking away—separating, multiplying, and dividing—sharing.)

There are excellent books written to support counting and other number skills and concepts. Many of the number concepts are found in the illustrations. Six books are described.

For each book, the story line is described and suggestions are made for ways that teachers can use the books with young children. Specific ideas are included on how to read each book to highlight the mathematical content. The glossary defines mathematical terms that are used.

Infants and toddlers enjoy hearing simple, rhyming language and looking at the pictures in counting books even before they understand the mathematical content.



What infants and toddlers can learn from counting books:

- Begin to understand that number words are about amounts of things.
- Begin to learn math words.

How teaching staff can use counting books with infants and toddlers:

- Point to the pictures that the number words refer to.
- Model counting small numbers of objects.
- Relate the words and pictures to the child's own experience.

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Preschool children love to count and explore number concepts in all their activities, including book reading.



What preschoolers can learn from counting books:

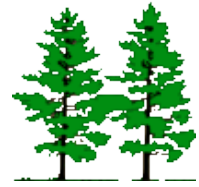
- Develop their counting skills.
- Explore number relationships and concepts in the book's text or illustrations.
- Practice using mathematical operations to solve real-life problems.
- Make connections between numerals, number words, and the number of objects they represent.

How teaching staff can use counting books with preschoolers:

- Count objects with the children.
- Encourage children to count to find out how many and to solve simple problems.
- Ask questions that guide children to explore number relations and concepts in the book's text or illustrations.
- Encourage older preschoolers to recognize and name some written numerals and notice that each numeral and number word stands for a particular number of objects.
- Plan activities that extend the mathematical ideas in books.

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Anno's Counting Book by Mitsumasa Anno

About the book . . .

This wordless book represents the numbers 1 through 12 in scenes of a growing village across the 12 months of the year. The first page has a snowy landscape with a river running through it. On the next page, the village begins to appear with one house, one child, one adult, one pine tree, etc. Objects are added as the village grows. The seasons and activities change. The scenes become more and more complex as the numbers of objects increase.

Using this book . . .

- Appropriate for preschoolers
- Some objects in the pictures are much easier to count because they are large or are in a line. Others are scattered about on the page, and you have to look for them. Count the easier ones first. Try the harder ones as children's skills develop.
- Read this book again and again over time as the children and you find new things to think about and more concepts to explore.
- Older preschool children can create their own counting books with scenes of their community, using numbers one to five (or more or fewer, as appropriate).
- This is a nice book to share with parents who may have a wide range of reading abilities. Parents can be encouraged to talk about each scene and count the objects with their children. Explain that children who are starting to count find an easier time counting larger objects that are arranged in a line. Children with more counting experience can be encouraged to count the smaller or less obvious objects that are scattered about the page.

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Anno's Counting Book by Mitsumasa Anno

Number and Operations ideas . . .

Counting up to 12 objects, cardinal numbers, comparing quantity

- Count the buildings, trees, adults, children, animals, and other objects with the children. Depending on the children's counting knowledge and skills, you may want to count the objects for the children, ask the children to count with you, or encourage them to count on their own. "Let's **count** the ducks walking in a row—**one, two, three, four, five, six, seven. Seven** ducks!"
- Ask questions about the numbers of objects. "**How many** pigs is the lady feeding?" "**How many** of the **same kind of flowers** (or trees) do you see?"
- Ask questions to encourage children to **compare numbers of items** in the pictures. "Do you think there are the **same number** of dragonflies and horses? Let's count to find out."

Number composition (composing and decomposing), addition (joining to)

- Ask questions to guide the children in exploring the math concepts and relations. "**Two** children are holding the rope. **How many** are running? **How many** children are there **altogether**?"
- Encourage children to describe and tell stories about what is happening in the scenes using number words and other math-related vocabulary. "See the children playing at the river? **How many** are **in** the water? What are the other children doing?"

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Feast for 10 by Cathryn Falwell
Spanish edition: ***Fiesta Para 10***



About the book . . .

In this counting book, a mother and children go shopping for food and then cook and serve a “feast” to their family. As the family shops for food, the numbers 1 through 10 are represented by one shopping cart and the items they put into it (two pumpkins, three chickens, and so forth). The sequence (1 to 10) is repeated at home when the family prepares and serves the meal. The book uses numbers in a real-life activity that children may relate to their own experiences.

Using this book . . .

- Appropriate for preschoolers
- Objects in this book are pictured as they might appear in real-life activities – shopping, cooking, and serving food. Children can practice counting objects that are not organized in lines or rows for easy counting. Help them, as needed, to find and count the objects.
- Have the children retell the story using props and math language from the book.
- Teaching staff can set up a grocery store for children to pretend to go shopping and practice their number skills.
- Share some ideas for math learning with parents. Parents can encourage children to tell their own story about going shopping or helping with cooking at home using the numbers 1 through 10. Children can also count to find out the answer to “How many?” on each page.

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Feast for 10 by Cathryn Falwell

Number and Operations ideas . . .

Counting up to 10 objects, cardinal numbers, comparing, numeral recognition

- Count the pictured items with the children. “Let’s count the pickles in this jar.” “Help me **count how many** children are helping with the shopping.”
- As you read the number words, point out the **numeral** on the page. Once children have learned to recognize and read some of the numerals, instead of saying the number word point to the numeral and let the children say it.
- Ask “How many?” questions that encourage children to compare numbers. “**How many** pumpkins for pie? **How many** chickens to fry? Are there **more pumpkins** or **more chickens**?” “**How many** ripe tomatoes? **How many** plump potatoes? Are there fewer (or **less**) tomatoes or potatoes?”

Number composition (composing and decomposing), addition and subtraction, problem solving

- Ask mathematical problems suggested by the text and pictures. “**How many** pans are on the stove? **How many** are in the oven? **How many** pans **altogether**?”
- After reading “**Ten hungry folks** to share the meal,” ask, “**How many** chairs at the table?” If necessary, go back to the page before to see that there are nine. Ask, “**How many** people don’t have a chair? Are there **more** people or chairs? What should they do?”

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Over in the Meadow by Paul Galdone



About the book . . .

This book is an adaptation of the old nursery counting rhyme – counting baby animals from one to ten. Each rhyming verse has two parts. First, we see a group of baby animals in their habitat (by the barn door, in their nest of sticks, etc.). Second, the mother tells the babies to do something (squeak, caw, etc.). The repeating pattern of the rhyme makes this an especially nice book for helping children learn the number sequence to 10.

Using this book . . .

- Appropriate for toddlers and preschoolers
- Read the book enough times to familiarize children with the repeating, rhyming pattern so that they can participate in the reading by saying the number, naming the animals, or making the animals' sounds.
- Toddlers will enjoy the rhyming and repetition and may want to join in with number words or animal sounds. They may want to try counting some of the animals.
- In addition to learning the rhyme, preschoolers will enjoy counting the animals and recognizing numerals.
- Share with family members that they can enjoy the repeating, rhyming pattern of the story as they read the book to their children. They can also count the animals together and look at the corresponding numeral to build children's understanding of numerals.
- There are many book versions of this counting rhyme. Use the one you have or prefer.

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Over in the Meadow by Paul Galdone

Number and Operations ideas . . .

Counting to 10, repeating and growing patterns

- Read the book to familiarize children with the repeating, rhyming pattern. Once they are familiar with the verses, children will enjoy participating by saying the number of baby animals. For example, after reading “. . . in a nest built of sticks, lived a noisy mother crow and her little crows,” stop and **let the children say the number** of crows.
- Encourage children to notice the **growing pattern** – each verse includes **one more** baby animal (from one to ten).

Counting to 10, cardinal numbers, number representation, numeral recognition, comparing number

- Count the baby animals with the children; stress the **last number counted**. “One, two, three, **FOUR**. There are **four** mice.”
- Encourage older preschoolers to **use their fingers to show how many**.
- If the version of the book you are using includes written numerals, point to the **numeral** when children say the number word to build their knowledge of written numerals.
- Ask questions that encourage children to **compare numbers** of things, for example “Count the flowers and the bees. Are there **more** flowers than bees?” or “Count the ducks who are diving and the ducks who are swimming. Are there **fewer (or less)** ducks diving or swimming?”

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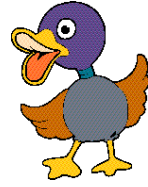
Adding one more, counting on

- Add one more by including the mother animal when counting. “There are **four** baby mice, and the mother mouse makes **one more**. **How many mice altogether?**” The children may need to count all the animals (the four babies and the mother) to get the answer. Encourage older preschoolers to count on from four to get the answer. “**Four, five. Five** mice altogether!”

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Highlighting Number and Operations

Quack and Count by Keith Baker



About the book . . .

This counting and adding book follows seven ducklings as they slip and slide through the forest, swim and splash in the water, and finally fly away. Even very young children will enjoy the ducklings' antics and the simple rhyming verse. Preschoolers will enjoy exploring the number concepts and practicing their counting, number composition, and adding skills.

Using this book . . .

- Appropriate for preschoolers
- The illustrations and rhyming text show all possible number combinations for seven (7 ducklings, 6 plus 1; 7 ducklings, 5 plus 2; and so forth). Encourage children to notice all the different ways to show seven.
- Children can draw pictures or use duck stickers to make their own pictures of seven ducks (or a different number of ducks or other animals or items) in different groupings.
- Older children may write, or have the teacher write, the corresponding numeral on each page of their books. Organize and display the children's pictures to show the possible number combinations for seven.
- Share with family members that they can encourage their children to notice all of the different ways to show the number seven as they are counting the ducklings.

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Quack and Count by Keith Baker

Number and Operations ideas . . .

Concept of seven, counting

- Count the ducklings with the children. Emphasize the meaning of the number words by pointing to the groups of ducklings as you read the numbers. “**7** ducklings, **5** plus **2**.”
- Count the ducks for toddlers, and encourage them to help you count. Have them help you “find” the ducks who are playing peekaboo.
- Encourage preschoolers to count the groups of ducks, such as 5 and 2, then to count all seven.

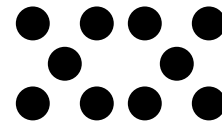
Number composition (composing and decomposing), addition and subtraction, math vocabulary (**plus** to signify addition)

- Older children can explore the addition “problems” in the book. After reading “4 plus 3,” say “**Four** ducklings over here and **three** ducklings over here. **How many** ducklings **altogether**?” Count with the children to check.
- As you read, encourage children to **represent** the **numbers** in the groupings **with their fingers** and to notice that they always add up to **seven**.
- Practice adding by **counting on** instead of counting all the objects. For example say, “**Five** ducklings here.” Then point to the sixth and seventh duckling as the children count “**six, seven**.” Ask, “**How many** ducklings **altogether**?”

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Ten Black Dots by Donald Crews
Spanish edition: **Diez puntos negros**



About the book . . .

In this book, large black dots (1 through 10 of them) become the eyes of a fox, spots on a snake, wheels on a train, and more. For example, five dots appear in a straight vertical row as buttons on a coat and then as the portholes of a boat, two at deck level and three below. This book helps children to begin to understand that changing the arrangement of objects doesn't change their number.

Using this book . . .

- Appropriate for toddlers and preschoolers
- When reading to toddlers, point to the groups of dots when you read the numbers. Count the dots and talk about how many there are. Because the dots are large and easy to count, toddlers may want to try counting them, too!
- When reading to preschoolers, ask them to compare the numbers of dots in the pictures. This will help them discover that rearranging objects does not change their number.
- This book can be used with other preschool activities that are based on various configurations of dots, such as card games, dice games, and dominos.
- Share with family members that as they read this book, they can encourage their children to compare the number of dots to find the same number.

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Ten Black Dots by Donald Crews

Number and Operations ideas . . .

Counting up to 10 objects, recognizing number in different configurations, comparing quantity, math vocabulary (number words, **same number**)

- Seeing the same numbers of dots in different arrangements helps children learn to recognize the patterns that particular numbers of objects form.
- Draw toddlers' attention to the pictures with the same small numbers of dots. "See, there are two dots here – the fox's eyes – and two dots here – the holes in the keys."
- Preschoolers can count and compare the numbers of dots in different arrangements. "**How many** dots make the spots on the snake? **How many** dots are stones to rake? Let's **count** to make sure there are the **same number** of dots here (spots) and here (stones)."
- Compare the number of objects by asking "**How many** foxes? **How many** keys? Are there **more** foxes or keys? Let's **count** to find out."
- As preschool children look at the different pictures and count the dots, encourage them to notice that the dots are the same number no matter how they are arranged. For example – "Here are the **five** dots in a straight line on the coat. Here the **five** dots are in **two** rows on the boat. How can we check to make sure the pictures have **the same number** of dots – **five** here and **five** here?"

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Ten, Nine, Eight by Molly Bang
Spanish edition: **Diez, Nueve, Ocho**



About the book . . .

In this counting book and bedtime story told in rhyme, a father and his little girl count down to bedtime. Beginning with “10 small toes” and ending with “1 big girl all ready for bed,” the book counts backward in scenes of bedtime routines in the child’s room. Even hugs and kisses are counted (“3”). The warm illustrations and simple lullaby-like quality of the language make this book appealing to even the youngest children.

Using this book . . .

- Appropriate for infants, toddlers, and preschoolers
- When reading this book to infants and toddlers, relate the number concepts to the child’s own experience—for example, their own “two strong arms.”
- With preschoolers, encourage children to count and compare pictured objects, recognize the numerals that tell how many objects, and learn to count backward from 10.
- Have children practice counting backward by using songs or short chants during large group activity time. For example, chant “Five, four, three, two, one” gradually moving from standing to a crouched position and then jump up saying “Blast off!”
- Share with family members that while reading this story, they can relate the number concepts to their child’s own experiences. For example, count the baby’s ten toes, then count their child’s toes and talk about the same number.

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Ten, Nine, Eight by Molly Bang

Number and Operations ideas . . .

Counting up to 10, counting objects, number correspondence

- Call the young child's attention to the relation between what is pictured on the book's pages, the book's words, and her own world. "See the baby's **10 toes**. Here are your **10** toes. You have the **same number** of toes as the baby."

Numerals recognition, counting backward

- Preschool children can also use this book to learn to recognize and read **written numerals** and to practice **counting backward**. Ask, "**What number comes next?**"

Comparing number, correspondence, addition and subtraction

- Older toddlers and preschoolers can also begin to notice the numerical relationships in the pictures. "There are **8** square windowpanes. See—there are **4 in each** window, 4 here and 4 here. They are the same number." "Where are the **4** sleepy eyes? Whose eyes are they?"
- The page with "7" shows pairs of shoes. Ask, "What is missing? **How many** shoes should there be?" "**How many** shoes make a **pair?**"